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AF/2826

PATENT

Attorney Docket No. 3817USUS (97-1350)

NOTICE OF EXPRESS MAILING

Express Mail Mailing Label Number: EV348040245USDate of Deposit with USPS: May 6, 2003Person making Deposit: Chris HaughtonIN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Examiner: F. Abraham

Group Art Unit No.: 2826

Applicant(s): Ball et al.

Filing date: August 27, 1999

Serial No.: 09/385,584

For (title): METHOD OF DISPOSING
CONDUCTIVE BUMPS ONTO A
SEMICONDUCTOR DEVICE
AND SEMICONDUCTOR
DEVICES SO FORMED

TRANSMITTAL OF REPLY BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attention: Board of Patent Appeals and Interferences

Sir:

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Transmitted herewith in triplicate is the REPLY BRIEF in this application further to the Examiner's Answer dated March 6, 2003.

Any additional appeal fees which are not otherwise submitted herewith or which are insufficient should be charged to deposit account no. 20-1469. A duplicate copy of this notice is enclosed. Please address all communications in connection with this appeal to the address indicated below.

Respectfully submitted,

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Date: May 6, 2003

Enclosures: As identified above



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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of:

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REPLY BRIEF

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P.O. Box 1450
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Sirs:

This brief, which is in reply to the Examiner's Answer mailed by the Patent Office on March 6, 2003, is submitted in TRIPLICATE, as required by 37 C.F.R. § 1.193(a), and within the two-month period for response that has been set by 37 C.F.R. § 1.193(b)(1).

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(4) STATUS OF AMENDMENTS

The "Status of Amendments" provided in the Examiner's Answer identifies an "amendment after final rejection filed on 8/22/02 . . .," that has not been entered. There is no amendment in the above-referenced application which is dated August 22, 2002. Moreover, the Brief of Appeal does not mention such an amendment. Accordingly, it is respectfully submitted that the "STATUS OF AMENDMENTS," as set forth in the Brief on Appeal, is correct.

(7) GROUPING OF CLAIMS

The Examiner's Answer, under the section labeled "Grouping of Claims," indicates that "[t]he rejection of claims 1 and 14 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof." This explanation is not understood, as claims 1 and 14 are no longer pending or under consideration in the above-referenced application.

It is respectfully submitted that the "GROUPING OF CLAIMS" in the Brief on Appeal is correct.

ARGUMENT

It is respectfully submitted that, with respect to the 35 U.S.C. § 103(a) rejections of the claims of the above-referenced application, the Office has not met its substantial burden in establishing a *prima facie* case of obviousness, as is required to maintain a rejection under 35 U.S.C. § 103(a).

(A) Reply to Assertions Made in Examiner's Answer

An accurate summary of the relevant teachings of Schwiebert is provided in the Brief on Appeal that was filed in the above-referenced application on November 14, 2002. By way of review, Schwiebert teaches conventional, preformed metallic solder masks (*see, e.g.*, col. 7, lines 38-49), as well as polymeric solder masks that are formed on the surface of a substrate that includes wettable regions (*e.g.*, bond pads, terminals, etc.) on which solder balls are to be formed (*see, e.g.*, col. 7, lines 24-28). Schwiebert lacks any teaching or suggestion of a preformed solder mask that comprises a film of polymeric material.

Schwiebert also teaches that the apertures 330 of the solder mask 326 described therein define a volume that will, along with the surface tension of the molten solder therein, will provide a solder bump 338 of a desired size (col. 9, lines 53-57), which does not contact the surface of the aperture 330 (*see* col. 5, lines 63-65) within which that solder bump 338 was formed. When a conventional metal solder mask is used, as taught in Schwiebert, such pulling away of molten solder from the surfaces of the aperture 330 would be necessary to facilitate subsequent removal of the solder mask 326. It is respectfully submitted that such pulling away

will occur regardless of the shapes of the apertures 330 (*i.e.*, round, square, etc.). Further, it is respectfully submitted that, regardless of the shapes of the apertures 330, the resulting solder balls 338 will still have somewhat spheroid shapes, which result from the properties of the solder paste that has been used to form such structures rather than from the shapes of the apertures 330 in which the structures were formed.

In contrast to the teachings of Schwiebert, each of independent claims 33, 43, and 49 of the above-referenced application recites a preformed solder mask that includes at least one open aperture that is configured to define a peripheral shape of a conductive structure to be formed therein.

There are at least two reasons that a *prima facie* case of obviousness has not been established against any of independent claims 33, 34, or 49, or against any of claims 34-37, 41, or 42, which depend from claim 33, claims 35-38, which depend from claim 34, or claims 50-56, which depend from claim 49.

There is No Motivation to Modify the Teachings of Schwiebert

First, it is respectfully submitted that one of ordinary skill in the art would not have been motivated to modify the teachings of Schwiebert in the manner that has been asserted.

As noted above and in the Brief on Appeal, the asserted modification of Schwiebert would change the manner in which the solder mask 326 described therein would operate. In particular, when the solder within an aperture 330 is heated, it would no longer pull away from the surfaces of the aperture 330 as it coalesces to form a solder ball 338.

Moreover, when the conventional, metallic solder mask 326 of Schwiebert is used, if the solder balls 338 did not separate from the surfaces of the apertures 330 thereof during formation of the solder balls 338, it would not be possible to subsequently remove the solder mask 326 from the substrate over which it is positioned.

For these reasons, it is respectfully submitted that there would have been no motivation for one of ordinary skill in the art to have modified the teachings of Schwiebert in the manner that has been asserted.

Schwiebert Does Not Teach or Suggest Each and Every Claim Element

Second, Schwiebert cannot support a *prima facie* case of obviousness against any of claims 33-37 or 41-56 because Schwiebert fails to teach or suggest all the limitations of these claims.

Specifically, Schwiebert does not teach or suggest that the solder mask thereof includes at least one aperture which is configured to define a peripheral shape of a conductive structure to be formed, as is recited in each of independent claims 33, 43, and 49.

As Schwiebert does not teach or suggest each and every element of any of claims 33-37 or 41-56, it is respectfully submitted that a *prima facie* case of obviousness has not been established against any of these claims.

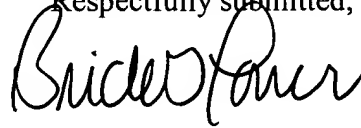
Additionally, the remaining reasoning in support of the allowance of claims 33-37 and 41-56 that is provided in the Brief on Appeal is reasserted herein, as if set forth herein in its entirety.

In view of the foregoing, reversal of the 35 U.S.C. § 103(a) rejections of claims 33-37 and 41-56 is respectfully requested.

CONCLUSION

Reversal of the rejections of claims 33-37 and 41-56 is respectfully requested, as is the allowance of each of these claims.

Respectfully submitted,



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